

Bearing means for a hand held portable tool such as a brush cutter

This invention relates to a bearing means for a hand held portable tool such as a  
5 brush cutter, a trimmer or the like said means comprising an elongated bearing sleeve  
that is provided with outwardly extending flanges or the like.

Bearing means of the type mentioned above are used to support elongated drive  
shafts that transmit forces from a driving unit to a remote cutting tool that is placed at  
10 the outer end of a tube shaped casing. Such bearing means are for instance described in  
US 5364307, US 5599233 and DE 3839548 and comprises an elongated sleeve with a  
circular cross section having outwardly extending flanges that rest against the  
surrounding casing. In order to make it possible to insert the bearing means into the  
casing and simultaneously avoid any play and keep the bearing sleeve in a central  
15 position when the drive shaft rotates the flanges are resilient. This means that the  
flanges as well as the sleeve have to be designed carefully since a flange that is too soft  
does not work properly with respect to the vibrations caused by the drive shaft whereas,  
if the flanges are too hard, the bearing means is difficult to insert into the casing.

20 The purpose of this invention is to create a new type of bearing means making it  
possible to decrease the vibrations on the casing caused by the drive shaft and to  
optimize the design and material thickness of the bearing means. Further the  
arrangement allows diametrical variations of the drive shaft as well as of the casing  
substantially without influencing the inner shape of the sleeve. An additional advantage  
25 is that the shape of the bearing means makes it possible to achieve a better lubrication  
than previously.

An embodiment of the invention will now be described with reference to the  
accompanying drawing that shows a cross section of the bearing arrangement with the  
bearing means, the drive shaft and the casing.

30 The bearing arrangement comprises an outer elongated tubular casing 10 that at one  
end is provided with drive means such as a combustion engine (not shown) or an  
electric motor whereas the other end of the casing is provided with some type of cutting  
tool such as a chain saw or a trimmer head (not shown). The power from the drive  
means is via a drive shaft 11 transferred to the cutting tool. The drive shaft is

surrounded by a bearing means 12 that comprises a bearing sleeve 13 with several flanges 14 extending radially outwards from the sleeve.

The bearing sleeve, which preferably is made of plastic and is integrated with the  
5 flanges, has a mainly triangular shape with three slightly curved wall portions 15 that  
are joined to one another at their ends to define the tips 16 of the triangle. Consequently  
the distance between the inner wall of the sleeve 13 and a circle inscribed in the sleeve  
increases from the mid part of each wall portion 15 towards the tip 16 of the triangle.

10 The flanges 14 are placed at the tips 16 of the triangle and are at their outer ends  
provided with a hook shaped outer portion 17. These hook shaped portions safeguard  
that manufacturing shrinkage occurs at the tip portion of the hook which means that the  
outer shape of the detail is diametrically stable.

15 In order to assemble the bearing arrangement the bearing means 12 is pushed into  
the tube casing 10 from one of its ends which means that the hook shaped portion 17 of  
the flanges 14 will come into engagement with the casing and cause the flanges to move  
somewhat inwards thereby compressing the sleeve 13 at the tips 16 of the triangle such  
that the complete bearing means can be pushed into the casing. The resilient forces of  
20 the sleeve will then keep the bearing sleeve in the right position in the casing and the  
drive shaft can than easily be inserted into the bearing sleeve.

It is of course also possible to use other geometric configurations of the cross  
section of the bearing sleeve such as square, pentagonal, hexagonal and so on and to  
25 place the flange at such point where the inner surface is at a distance from the inscribed  
circle such that the material of the sleeve serves as a spring for the radial movement of  
the flanges.